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The Role of Career Advising in High School in Shaping the Aspirations of First-Generation Students

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Abstract

College aspirations often form by 8th grade, yet first-generation students—those whose parents lack post-secondary education—miss out on resources continuing-generation peers use to make informed decisions about their futures. School-based career advising can help fill this gap. Using 2018 PISA data, this study examined whether the provider (counselors vs. teachers) and scheduling format (formal vs. voluntary) of career advising in the United States and Costa Rica affected first-generation students' college aspirations. In both countries, first-generation students expected to progress less far in their studies than continuing-generation peers, with a larger gap in the United States. Provider specialization was not associated with changes in aspirations in either country, though Costa Rican students may benefit more from counselor advising than teacher advising. Scheduling format also showed no significant association with aspirations. These findings suggest structural barriers facing first-generation students may matter more for college aspirations than how career advising is delivered.

JEL Classification: I21, I24, I25
Keywords: college aspirations, career advising, first-generation students, school-based interventions, school counseling

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The Role of Career Advising in High School in Shaping the Aspirations of First-Generation Students

Students' aspirations in high school can shape their post-secondary pathways and pave their way to college or into the labor market. Indeed, empirical evidence aligns with the theory that high aspirations can lead individuals to achieve better educational and labor market outcomes (Fruttero, Muller, and Calvo-González, 2021). However, there is also evidence that a mix of social and circumstantial factors can hinder the aspirations of traditionally disadvantaged groups (Fruttero, Muller, and Calvo-González, 2021). In particular, first-generation students—those whose parents did not attend college—have lower expectations of attending college after high school graduation than their continuing-generation peers (Choy, 2001).

First-generation students have fewer resources that help continuing-generation students make informed decisions about their post-secondary futures. Individuals' expectations to attend college are formed based on economic and social factors, such as cost–benefit analyses (Becker, 1993), peers' college-going culture (Hallinan and Williams, 1990; Cohen, 1983), and social and cultural capital (Jackson, 2008). However, even when the returns to first-generation students from education are high, many can have imperfect or incomplete information when deciding whether to continue their studies. First-generation students tend to be racial and ethnic minorities or come from families in the lowest income quartile (Choy, 2001), and this affects other factors—like where they live or their networks and relationships; in turn, these factors affect whether they encounter fewer people with college degrees who are able to provide them with the necessary information and guidance (Dickson and Pender, 2014). Similarly, students from a lower socioeconomic status may also have different perceptions of the costs of a college degree and are

more likely to find barriers in the capital market to fund their studies (Carneiro and Heckman, 2002).

In these situations, school-based services can help inform students' decisions about their post-secondary pathways. While it is more difficult to change family conditions, culture, or social capital, the resources offered at school can play an important role in shaping student aspirations. In particular, school-based mentoring (Kraft, Bolves, and Hurd, 2021) and counseling (Pham and Keenan, 2011) appear to be relevant for student academic success and post-secondary outcomes. School-based resources can be of particular help when parents cannot support their students with informed advice on curriculum, the application process, or post-secondary options. Thus, this study investigates if career advising given in high school has any effect on students' aspirations to attain some college degree after graduating from high school.

Data for this study come from the 2018 wave of the Programme for International Student Assessment (PISA), conducted by the Organisation for Economic Co-Operation and Development (OECD). This database includes information on student aspirations after high school as well as the career counseling services they have received. Drawing from these data, I investigate whether certain characteristics of the career advising offered at school affect first-generation students' aspirations. Specifically, using PISA data for the United States and Costa Rica, I explore whether (a) school-based advising offered by teachers or counselors has a differentiated association with first-generation students' aspirations to complete some tertiary education, and (b) school-based advising that is formally scheduled rather than voluntarily sought has a differentiated effect on first-generation students' aspirations.

The results for both countries show that formally scheduled counseling, compared to voluntary, is not associated with changes in the aspirations of first-generation students to attend

college. Similarly, the career advisor, whether counselor or teacher, compared to a combination of both, is not associated with first-generation students' aspirations. However, there is some evidence that students in Costa Rica may benefit more from their advisors being counselors and not teachers. For continuing-generation students in the United States, a negative association is found when the advising is provided only by counselors compared with advising given by both teachers and counselors. In Costa Rica, a negative association was found for continuing-generation students when the advising was scheduled compared to having it voluntarily set.

LITERATURE REVIEW

Education is one of the main investments in human capital. According to Becker (1993), people will accumulate education as long as the benefits are greater than the costs—that is, if the expected net benefits of education are positive. In the case of higher education, returns on college attendance have been well documented (see, for example, Angrist and Krueger, 1991, 1992, 1995; Bowen, Chingos, and McPherson, 2009; Card, 1995, 2001; Heckman, Lochner, and Todd, 2006; Hines, Tweeten, and Redfern, 1970; Kane and Rouse, 1993; Psacharopoulos, 1989). Likewise, international data show that more educated people receive above-average earnings (Becker, 1993) and suffer lower unemployment rates than people with less education (BLS, 2026; Robalino, Trejos, and Paredes, 2017; Torpey, 2018).

Even with the possibility of reaping positive returns, however, some populations find it more difficult than others to bear the necessary costs. In particular, some may see their access to college hindered because they find it more difficult to fund the costs associated with studying (Carneiro and Heckman, 2002), assess the information about future benefits (Oreopoulos and Dunn, 2013), and access the required information for applying to college (Bettinger et al., 2012). First-generation students (i.e., those whose parents have not attended college) are more likely to

be in this group than continuing-generation students (i.e., those whose parents have attended some level of tertiary education). The former may benefit from investing in higher education but are nevertheless underrepresented among college graduates (Horn and Nuñez, 2000). Compared to continuing-generation students, first-generation students tend to come from ethnic minority backgrounds and from the lowest income groups (Ward, Siegel, and Davenport, 2012; Choy, 2001).

Similar to other capital investments, investment in education involves covering most of the costs in the short run and reaping the benefits in the medium to long run. While younger people have a greater incentive to invest in education, it might be more difficult for those who come from poor households to make the investment happen (Becker, 1993). A lower income also limits the possibilities of investing in education through loans. As human capital is an investment that does not come with a collateral to provide for the loan, internal financing is common, and wealthier families tend to invest more than poorer ones (Becker, 1993).

In decisions about whether to attend college and about which institution to attend, first-generation students are likely to weight cost-related reasons. For instance, they are likely to prefer institutions where they can continue living in their parents' home, balance school and work time, be able to get a job at the school, receive financial aid, and/or finish their degree in a shorter period of time (Tym et al., 2004; Nuñez and Cuccaro-Alamin, 1998). However, the decision to invest in education also depends on the information the person has about costs and benefits before the moment of application. Unfortunately, that information is not equally distributed among the younger population.

Dickson and Pender (2014) point out that individuals from families with lower socioeconomic status may have less information regarding the returns on a college degree than

individuals from families in a higher socioeconomic class. This is due in part to the fact that socioeconomic status affects other factors, such where someone lives, their occupation, and even their networks and relationships. Ultimately, this affects whether young adults encounter people with college degrees who are able to provide the information and guidance to help them make decisions about their educational pathways. The limited transmission of information from parents and networks to first-generation students can be an early limitation on their aspirations (Vargas, 2004).

For students whose parents have attended college, parental involvement predicts aspirations; for first-generation students, perceptions of their own ability and the importance of good grades is a better predictor (McCarron and Inkelas, 2006; Tym et al., 2004). As some authors have modeled out, the decision to attend college is a multi-step process that starts with a desire to attend (see Manski and Wise, 1983; Choy, 2001). Theory and empirical evidence show that high aspirations can lead individuals to achieve better educational and labor market outcomes (Fruttero, Muller, and Calvo-González, 2021). Students can formalize their educational plans as early as 8th grade, and they tend to be more realistic with regard to their aspirations by 10th grade (Horn and Nuñez, 2000; Hossler and Stage, 1992; McCarron and Inkelas, 2006).

Furthermore, parental involvement affects students' high school curricular choices and college enrollment. In this planning, non-first-generation students are more likely to rely on their mothers (or fathers when they have higher education) for guidance; first-generation students are more likely to report having these discussions with friends (Horn and Nuñez, 2000). This affects students' college choices since, as an example, the rate at which they complete advanced-level high school (mathematics) courses has a direct bearing on whether or not they enroll in a 4-year

college within 2 years of graduating from high school (Horn and Nuñez, 2000; Riley, 1997) and on their level of preparedness if they attend (Atherton, 2014).

School-based services provided by pre-collegiate outreach programs are designed to make up for the lack of role models by providing students with the necessary social capital and academic preparation to achieve college enrollment (Gullatt and Jan, 2003; Tym et al., 2004). According to Gullatt and Jan (2003), informational outreach, career-based outreach, and academic support are three common types of pre-collegiate academic development programming. As described by Tym et al. (2004), *informational programs* focus on information dissemination and advising, with little or no academic intervention in the way of actual instruction. *Career-based programs* are interventions designed around students' career aspirations and intended to link those aspirations with college majors. *Academic support programs* are instructional services designed to increase students' performance for college readiness.

Commonly, high schools hire guidance counselors who can provide students with information and career guidance. Guidance counselors can support high schoolers by (a) providing information about education and career options, (b) providing guidance about curricular choices, and (c) supporting the college application process. College counseling could be particularly beneficial to first-generation students who, as noted, tend to come from low-income families and are likely to have less guidance from their relatives. Students from lower-income families have the greatest need for college counseling yet have historically had the least access to counselors (Avery, Howell, and Page, 2014). The student-to-counselor ratio is an important predictor of college enrollment for highly qualified (first-generation) students (Pham and Keenan, 2011; Bryan et al., 2011; Hurwitz and Howell, 2013); unfortunately, shortages of school counselors remain common even in developed countries. For example, the average number of students per counselor in the

United States is 471, which far exceeds the recommendation of 250 by the American School Counselor Association (Avery, Howell, and Page, 2014).

In the absence of sufficient counselors, other school personnel such as teachers and coaches may take on advisory roles with students, fostering informal natural mentoring relationships that arise organically from day-to-day interactions (Kraft, Bolves, and Hurd, 2021). These school-based mentors are uniquely positioned to help students navigate obstacles and guide them toward higher education, and the benefits have been found to be the largest for students from lower socioeconomic backgrounds (Kraft, Bolves, and Hurd, 2021).

Other studies have already found that when students receive support from their high school in the application process it can increase their chances of enrolling in college (Horn and Nuñez, 2000). However, by the time students reach the application stage, they have already decided to attend college. This paper focuses on an earlier and critical step in students' educational pathways: the formation of college aspirations. It is at this stage that students first begin to envision college as a possibility for themselves, before any formal decision has been made, making it a particularly important window for intervention.

Specifically, this paper examines whether the person providing regular academic advice to students in high school is associated with their college aspirations. While counselors are traditionally expected to fill this advisory role, we know that teachers and other school staff often take on these responsibilities as well (Kraft, Bolves, and Hurd, 2021). An open question remains whether the source of the advice matters, or whether students benefit from guidance regardless of who provides it. This paper also examines whether the structure of counseling itself shapes who benefits from it. When advising is voluntary, students who seek it out are likely those who are already more certain about attending college and better positioned to do so. Making counseling

sessions mandatory could broaden access to information and guidance, reaching students who might not otherwise seek advice, including first-generation students who are at risk of missing out on the information needed to make informed decisions about their futures. If counselors can provide meaningful information about education, work, and curricula options, increasing access to these conversations may be a promising pathway to fostering college aspirations among underserved students.

CHARACTERISTICS OF FIRST-GENERATION STUDENTS

Consistent with prior research, in this study, first-generation students are defined as those whose parents have not had post-secondary education (Redford and Hoyer, 2017; Ishitani, 2006; Chen, 2005; Choy, 2001). Both the United States and Costa Rica have documented that first-generation students are disproportionately drawn from lower socioeconomic strata and tend to lack the social capital that would help them navigate higher education (Choy, 2001; CONARE, 2024) Characteristics of first-generation students in each country are presented below.

United States

Among 1992 high school graduates in the United States, 27 percent were from families in which neither parent had any postsecondary education (Choy, 2001). Compared to continuing-generation students, first-generation students are older, have lower incomes (Choy, 2001; Redford and Hoyer, 2017), are more likely to be female, and are more likely to be married (Nuñez and Cuccaro-Alamin, 1998). Compared to continuing-generation students, first-generation students are more likely to be a racial minority (Bui, 2002; Choy, 2001; Lee et al., 2004; McCarron and Inkelas, 2006; Terenzini et al., 1996; Warburton, Burgarin, and Nuñez, 2001)—in particular, Black or Hispanic (Choy, 2001). For instance, more than two out of five Hispanic freshmen at four-year colleges are the first in their family to attend college, compared with about one out of five white

freshmen (Schmidt, 2003). In terms of socioeconomic status, first-generation students typically come from households with fewer resources (Bui, 2002; Choy, 2001; Lee et al., 2004; McCarron and Inkelas, 2006; Terenzini et al., 1996; Warburton, Burgarin, and Nuñez, 2001), often from families in the lowest income quartile (Choy, 2001).

First-generation students' aspirations start to vary from those of continuing-generation students as early as the 8th grade. Among 1992 high school graduates in the United States, 55 percent of first-generation students aspired in 8th grade to obtain a bachelor's degree, compared to 91 percent of 8th graders whose parents had a bachelor's degree (Choy, 2001). They are also less likely to be academically prepared for college, as they less often participate in academic programs leading to college enrollment (Horn and Nuñez, 2000) and have lower grades than continuing-generation students. For instance, first-generation students are less likely to take algebra classes before high school, and then are less likely to complete advanced math classes in high school (Choy, 2001). They show lower rates of completion of academically rigorous courses (Choy, 2001; Cushman, 2007; Terenzini et al., 1996; Warburton Burgarin, and Nuñez, 2001) and typically rank below continuing-generation students when comparing grade point averages (Lee et al., 2004). First-generation students are less likely to take the SAT or ACT in high school (Choy, 2001) and they score lower on standardized examinations than their continuing-generation peers (Bui, 2002; Choy, 2001; Warburton, Burgarin, and Nuñez, 2001). Among 1992 high school graduates, 25 percent of first-generation students took the SAT or ACT in high school, compared to 73 percent of students whose parents had a bachelor's degree (Choy, 2001).

First-generation students' enrollment in college is systematically lower than that of continuing-generation students. While about 82 percent of U.S. continuing-generation students enrolled in college immediately after finishing high school in 1992, only 54 percent of students

whose parents had only completed high school and 36 percent of those whose parents had less than a high school diploma did the same (Choy, 2001). Even the most academically prepared first-generation students are less likely to enroll in post-secondary education (Horn and Nuñez, 2000).

In the United States, a parent's level of education is associated with the type of higher education institution selected by their children. While 65 percent of continuing-generation students graduating from high school in 1992 enrolled in four-year colleges, only 21 percent of first-generation graduates enrolled in one (A Shared Agenda, 2004). A decade later, this figure had not changed much. Choy (2001) indicates that there is a greater share of first-generation students at less-than-2-year institutions (73 percent) than at 2-year institutions (53 percent), and an even smaller share at 4-year institutions (34 percent).[1] Indeed, most first-generation students begin college at a community college (Tym et al., 2004). First-generation students are also more likely to attend college only part-time while living off-campus with family or relatives. They are less likely to be in a bachelor's degree program, tend to delay entering post-secondary education after high school graduation, and receive more financial aid or work full-time while enrolled (Nuñez and Cuccaro-Alamin, 1998).

First-generation students in the United States are less likely to be retained and complete a degree than non-first-generation students (Choy, 2001; Nuñez and Cuccaro-Alamin, 1998; Thayer, 2000). They have a higher risk of attrition than their continuing-generation counterparts (Engle and Tinto, 2008; Ishitani, 2003, 2006; Choy, 2001; Pascarella et al., 2004) and are less likely to complete their program in a timely manner (Ishitani, 2003, 2006). According to Redford and Hoyer

[1] Less-than-2-year institutions are postsecondary schools where programs are completed in under two years and do not lead to an associate or bachelor's degree. Students typically enroll in these schools to gain a specific vocational skill and enter the workforce quickly. Examples include vocational/trade schools, certificate programs, career/technical schools, and some community college certificate tracks designed to be completed in less than two years.

(2017), 10 years after they were sophomores in high school, approximately 20 percent of first-generation college students and 42 percent of continuing-generation students had obtained a bachelor's degree.

Costa Rica

According to the 2019 State of Education report (*Estado de la Educación* in Spanish), in the period 2010-2018, Costa Rica experienced a 3 percentage points increase in the proportion of people 18 to 24 years old who attended tertiary education. This growing college enrollment, rising from 26 to 29 percent, is due in part to improvements in the secondary education level that is now graduating more students able to continue their tertiary education (PEN, 2019). This growth includes the admission of populations that were outside of the system before—for instance, students from remote areas and impoverished families. The proportion of high school graduates from the lowest income quintile increased from 20 percent in 2010 to 34 percent in 2017, and the proportion of graduates of this quintile entering college almost doubled from 8 percent in 2010 to 14 percent in 2017 (PEN, 2019). Even though young people from wealthier households and with more educated guardians are more likely to attend college, part of the increase in college enrollment comes from a greater participation of students from poorer households who are first-generation (PEN, 2019). In Costa Rica, first-generation college students represent about 17.8 percent of all 18- to 24-year-olds and almost 60 percent of all college students in the same age range (PEN, 2019).

When compared to continuing-generation students, first-generation students do not show a differentiated risk of attrition or failure in completing their college degree (PEN, 2019). About 65.2 percent of all college graduates between 2011 and 2013 were first-generation (Kikut and Gutiérrez, 2018). The average characteristics of first-generation graduates are similar to those of

current first-generation college students (PEN, 2019)—the only difference is a greater representation of women among current students, largely because men tend to delay their studies more than women (PEN, 2019). Compared to continuing-generation students, first-generation students are older and graduate at an older age. However, it is not possible to know whether this is due to delays in high school or because it takes them longer to complete college as they balance work and studies (PEN, 2019): First-generation students are more likely than their continuing-generation peers to work while studying (83 percent versus 68 percent; PEN, 2019).

First-generation graduates are concentrated in education, economic sciences, and law majors, which are offered across the country and by both public and private universities; they are underrepresented in STEM majors (PEN, 2019). Majors that take less time and money to complete might be preferred by first-generation students. For instance, comparing nursing and medicine, half of first-generation students choose one and half the other, but 19 percent of continuing-generation students choose nursing and 81 percent choose medicine (PEN, 2019).

About half of all college students in Costa Rica attend a public university (PEN, 2019); among these students, almost half declare that their scholarship is their main source of income (CONARE, 2019). This proportion is greater in poorer areas of the country, like the Northern and Caribbean regions, and for specific populations, such as first-generation students. Approximately 67.4 percent of all first-generation graduates from public universities funded their studies through a university scholarship (PEN, 2019). This percentage increases to 70 percent (*Universidad Técnica Nacional* or UTN in Spanish) and 80 percent (*Universidad Estatal a Distancia* or UNED in Spanish) at some particular public universities (PEN, 2019).

DATA AND EMPIRICAL STRATEGY

Data Source and Sample Characteristics

Data for this study come from the 2018 wave of the Programme for International Student Assessment (PISA), which is conducted by the Organisation for Economic Co-Operation and Development (OECD). In contrast to administrative data, survey data from PISA provides information on school, student, and household characteristics from the same source.[2] In particular, PISA includes student- and school-level variables that help control for factors that affect a student's academic performance in high school as well as their aspirations for the future.

PISA measures performance on standardized tests of mathematics, science, and language for a sample of 15-year-old students in each OECD country. It also includes information on students demographics, current absenteeism, and early education attendance, among other things. Importantly for this study, PISA 2018 included an Educational Career Questionnaire that asked students about their plans for work or study five years into the future, the highest level of education they expected to attain, and the steps they had taken to prepare for their future careers. These activities included completing internships, attending job fairs, consulting with career advisors inside or outside school, and researching career pathways and student financial aid, among others. Additionally, students report their parents highest educational level attained and a list of possessions at home; this information is used to create wealth and educational indexes.

School administrators report whether career counseling services are available at their institutions, who is primarily responsible for delivering them (e.g., teachers or guidance counselors), and whether these services are formally incorporated into students' school schedules

[2] However, the number of observations, in particular of schools, is smaller in survey data than in large administrative data sets and this can result in a sample limitation.

or are sought voluntarily by students. They also report whether the school is located in a city or small village (rural) and whether or not the school receives public funding. Other reported information includes class size, the number of weekly lessons taught by subject, and the qualifications of teachers.

Panel A of Table 1 presents summary statistics of the sample in 2018 for the United States and Costa Rica. In the United States, 113 schools were included in the sample, 63 percent of which were located in a rural area. The great majority (97 percent) received public funding; their average class size served 26 students, and there was one teacher for every 17 students. About 80 percent of teachers had a bachelor's degree, and students received on average four classes of math per week. For Costa Rica, 194 schools were included in the sample, most of which were located in a rural area (85 percent) and received public funding (84 percent). Class size was almost 27 students on average, and there was one teacher for every 15 students at school. Overall, 62 percent of the teachers in the Costa Rican sample had a bachelor's degree, and students received five lessons of math per week.

Leaving aside observations without data for the main variables of interest, the PISA sample includes information on 3,120 students for the United States and 5,535 for Costa Rica. In both countries, half of the students were female and their average age was close to 16 years. There was a greater presence of immigrant parents in the United States than in Costa Rica: About 76 percent of the students in the United States were born to a native mother, compared to 84 percent in Costa Rica. Students in Costa Rica were more likely to have attended early education (93 percent) than students in the United States (87 percent). Students in Costa Rica on average lacked educational

resources at home (-0.72 in HEDRES[3]) and reported more absenteeism problems (52 percent) than students in the United States (-0.11 in HEDRES, 24 percent with absenteeism).

First-generation students made up about 33 percent of the students in the United States sample and 44 percent of those in Costa Rica. For the most part, their distribution of characteristics reproduced the same patterns and differences found among the whole body of students between the two countries; the only difference was that first-generation students in Costa Rica concentrated more women than the United States. However, compared to their continuing-generation peers in their own country, first-generation students in the United States were more likely to have an immigrant mother, were less likely to have attended early education, possessed fewer educational resources at home, and were more likely to be absent from school. Similarly, in Costa Rica, first-generation students were more likely to have an immigrant mother, had fewer educational resources at home, and were more likely to be absent from school than their continuing-generation peers.

Prior research has shown that there is a systematic difference in grades between first-generation and non-first-generation students (Atherton, 2014). Likewise, studies have shown that students' educational aspirations are partly shaped by academic achievement and perceived academic ability (Carpenter and Fleishman, 1987). And, for potential first-generation students, scores on standardized tests, in particular mathematics, predict college attendance (Horn and Nuñez, 2000; Bui, 2005). As such, the analytic sample (shown in Panel B of Table 1) is limited to

[3] In PISA, students report the availability of 16 household items, including three country-specific household items that are seen as appropriate measures of family wealth within the country's context. Students also report the amount of possessions and books at home. Five indices are derived from these items, one of which is the home educational resources (HEDRES) index. The HEDRES index includes the following indicator items: a desk to study at, a quiet place to study, a computer the student can use for schoolwork, books to help with schoolwork, and a dictionary.

students whose score is above their school median in any PISA subject (math, science, or language).

To consider the possibility that parents might choose their children's school based, among other factors, on which school offers services that prepare students for college, the sample is limited to only those schools that offer career advising services. Note that this limits the study scope to an analysis of the differences across different types of advising; thus, inferences about advising in general cannot be made. The sample is also limited to schools that serve both first-generation and continuing-generation students. These sample restrictions leave 96 percent of the schools surveyed in the United States (62 percent of the students) and 92 percent of the Costa Rican schools (65 percent of the students).

The resulting distribution of school characteristics remains similar to that of the full PISA sample for both countries. An exception is a greater representation of schools that receive public funding in the analytic sample for Costa Rica. This might be a result of eliminating private schools that serve only continuing-generation students. However, the share of first-generation students in the analytic sample is practically the same as in the full sample—30 percent for the United States and 44 percent for Costa Rica. The distribution of student characteristics also remains similar to the distribution in each country's full sample.

Empirical Strategy

Students from traditionally disadvantaged households are likely to have lower expectations of continuing their studies after high school. First-generation students might have particularly low expectations, since they cannot rely on a parent's experience to learn about college. First-generation students are of particular interest since they can break a cycle of low education, and in

many cases, low income. To test whether first-generation students have different post-secondary aspirations than their peers, the following regression is estimated by Ordinary Least Squares,

$$Y_{is} = \alpha + \beta firstgen_i + X_i\sigma + S_s\tau + \varepsilon_{is} \quad (1)$$

where Y_{is} is a dummy variable that denotes the post-secondary expectations of the student *i*.

Equation 1 is estimated separately for three possible outcomes, with Y_{is}=1 if the student *i* expects to (a) complete any level of tertiary education, (b) be studying in 5 years, or (c) be working in 5 years. Outcomes (b) and (c), however, can only be estimated for Costa Rica, as the data required are not available for the United States. The variable $firstgen_i$=1 if none of the student's parents attended college—that is, if the student is a potential first-generation student. X_i is a vector of student characteristics that includes an indicator for female students, their age, an indicator for whether their mother is native to their country, and whether they attended early education.[4] S_s is a vector of school characteristics that includes an indicator for schools located in a rural area, schools that receive public funding, as well as the number of weekly lessons in math, class size, student-to-teacher ratio,[5] and the share of teachers with a bachelor's degree. Errors are clustered at the school level.

Next, I attempt to estimate the relationship between different types of career advising and student expectations to attend college. However, there could be an endogenous relationship where career advising might affect the odds of a student attending college, while a student who wants to attend college can also be more likely to seek career advising. Furthermore, students self-select into career advising if they consider themselves to be college material.

[4] Other individual controls, such as a measure of educational possessions at home (the HEDRES index) and whether the student is frequently absent from school, were included in previous estimations for which the results are robust. However, these controls are not included in the final specifications, as they can be endogenous with the indicator of first-generation student.

[5] Previous studies have pointed out that similarly important is the student-to-counselor ratio; however, this variable is not available in the PISA data.

To overcome the reverse causal relationship between career advising and student expectations, career advising is observed at the school level, but student college expectations are observed at the student level. A school that offers the service of career advising could affect a student's plans for the future, while a student who plans to continue studying after high school does not affect the school supply of services. However, parents and students who expect to continue studying after high school could choose schools that offer more services that prepare them for college, including career guidance services. To account for this, the sample includes only schools that offer career guidance, and regressions control for household and school observables that could affect selection into a particular school.

To reduce the selection bias that comes from students with a desire to pursue tertiary education self-selecting into career advising, the sample includes only students who are considered to be academically ready for college.[6] In this study, the analytic sample includes students who performed above their school median in any subject tested in PISA (math, science, or language). Controls of observable history of early education and demographics are also included.

Schools offer career advising through their teachers, counselors, or a combination of both teachers and counselors. Taking the counseling provided by both teachers and counselors as the comparison group, I test whether career advising offered through different providers has differentiated effects on student post-secondary aspirations through the following regression:

$$Y_{is} = \alpha + \beta_1 teachersCA_s + \beta_2 counselorsCA_s + \delta firstgen_i + \pi_1 firstgen_i * teachersCA_s + \pi_2 firstgen_i * counselorsCA_s + X_i\sigma + S_s\tau + \varepsilon_{is} \quad (2)$$

[6] Academic preparation in high school affects student's probability of taking and passing college admission tests, and the odds of college success. Both the United States and Costa Rica use standardized tests as part of their mechanisms to select students into many of their 4-year universities. These tests are designed to measure students' abilities on logic, math problem solving, and language.

where $\beta_1+\pi_1$ is the effect on first-generation students of career advising provided only by teachers compared with career advising provided by both teachers and counselors. $\beta_2+\pi_2$ is the effect for first-generation students of career advising provided only by counselors compared with both teachers and counselors; the difference $\beta_2+\pi_2-\beta_1-\pi_1$ reflects the effect of advising provided only by counselors compared with only teachers' guidance.

For continuing-generation students, β_1 reflects the estimated effect of advising provided by teachers compared with both teachers and counselors. β_2 is the effect of only a counselor's advising compared with both teachers and counselors, while the difference $\beta_2-\beta_1$ is the effect of advising from only counselors compared to only teachers.

Relative to continuing-generation students, first-generation students have an effect of π_1 for receiving only teachers' advising versus both teachers and counselors, π_2 for receiving only counselors' advising versus both teachers and counselors, and $\pi_2-\pi_1$ if their advising come from only counselors versus only teachers.

Schools can decide to let students voluntarily program their appointments for career advising or have them formally scheduled. To test whether each of these settings has a different effect on student aspirations, the following specification is regressed:

$$Y_{is} = \alpha + \theta scheduled_s + \pi firstgen_i + \lambda firstgen_i * scheduled_s + X_i\sigma + S_s\tau + \varepsilon_{is} \quad (3)$$

where $\theta+\lambda$ is the effect for first-generation students of formally scheduled career advising compared with voluntary career advising. For continuing-generation students, θ reflects the effect of having career advising formally scheduled compared to voluntary advising. Relative to continuing-generation students, λ is the effect on first-generation students of scheduled advising versus voluntary.

RESULTS

First-generation students in the United States have lower expectations of completing a higher education degree in the future than their continuing-generation peers: Panel A of Table 2 shows that they are on average 10 percentage points less likely to expect completing some level of tertiary education.

Compared to continuing-generation students, first-generation students in Costa Rica are less likely to expect completing some tertiary degree in the future, less likely to see themselves studying in 5 years, and more likely to see themselves working in 5 years. Considering that students surveyed in PISA are around 15 years old, 5 years into their future would be their second or third post-secondary year if they graduated on time from high school.

Results in Table 2, Panel A, show that first-generation students in Costa Rica are 2–3 percentage points less likely to expect completing a college degree in their future than their continuing-generation peers. Panel C shows their expectations of studying in 5 years. Before controls, first-generation students are about 4 percentage points less likely to see themselves studying in 5 years. This coefficient remains negative after controls, although it is smaller and not significant. Furthermore, Panel D shows that first-generation students are about 4 to 6 percentage points more likely than continuing-generation students to see themselves working in 5 years.[7]

United States

For U.S. first-generation students, whether career guidance is offered exclusively by teachers or counselors—compared with a combination of both professionals—does not make a difference in expectations to complete tertiary studies in the future. Compared to receiving career

[7] Data about students' plans to work or study in the United States five years after being surveyed is not available.

guidance from both teachers and counselors, first-generation students who receive career guidance exclusively from teachers do not have statistically different expectations (Table 3, Row 1a). Similarly, first-generation students who receive their guidance only from counselors do not have statistically different expectations from their peers who received career guidance from both teachers and counselors (Row 1b). Compared to receiving guidance only from teachers, first-generation students who receive guidance only from counselors do not have statistically different aspirations either (Row 1c). This suggests that specialization of the career guidance provider, whether a teacher or a counselor, is not associated with gains in the college expectations of first-generation students.

For continuing-generation students in the United States, the specialization of advice from counselors is negatively associated with their aspirations compared to relying on advice from both teachers and counselors (Row 2b). Receiving career advice exclusively from teachers is not associated with a difference in aspirations compared to receiving advice from both teachers and counselors (Row 2a). Similarly, there is no significant difference in continuing-generation students' expectations to pursue a college degree when their career advice is provided exclusively by counselors compared to only by teachers (Row 2c).

Relative to continuing-generation students, first-generation students in the United States have no statistical difference in their aspirations if the advising comes only from teachers (Row 3a) or only from counselors (Row 3b) compared to a combination of both. Similarly, there is no difference in aspirations if the advising is provided only by counselors versus only by teachers (Row 3c).

Schools can decide whether career advising is voluntary or formally scheduled for students. Results of Table 4 show that for both first-generation (Row 1a) and continuing-generation students

(Row 2a) in the United States, formally scheduled advising, compared to voluntary advising, is not associated with significant differences in student aspirations to attend college. Similarly, relative to continuing-generation students, first-generation students with scheduled advising have no significant differences in their aspirations when compared to having voluntary advising (Row 3a).

In sum, the results for the United States indicate that first-generation students are about 10 percentage points less likely to expect completing some tertiary educational level in their future than continuing-generation students. For first-generation students, the specialization of the career guidance provider, whether teacher or counselor, or having advising formally scheduled instead of being voluntary, is not associated with changes in aspirations. For continuing-generation students, advising provided only by counselors (compared to both teachers and counselors) has a negative association with aspirations. Notably, there is no difference in aspirations associated with having career advising formally scheduled instead of being voluntarily sought.

Costa Rica

For first-generation students, whether career guidance is provided exclusively by teachers or counselors (versus by both professionals) is not associated with differences in expectations to attend college. Results in Table 3 show that first-generation students who receive career guidance from teachers do not have significantly different expectations than first-generation students whose career guidance comes from both teachers and counselors (Row 1a). Similarly, first-generation students receiving guidance from counselors do not show statistically significant differences in their expectations when compared to those who receive career guidance from both teachers and counselors (Row 1b).

There is, however, some evidence that advising from counselors only may be more beneficial to first-generation students than advising from teachers only. Results in Table 3 (Row 1c) show a positive association between counselors' advising and first-generation students' aspirations when compared to advising from teachers only. Although this coefficient is not statistically significant at the 10 percent level after school controls, it remains positive with a similar magnitude to the other specifications.

The results for continuing-generation students show that the specialization of the career advising provider—teachers (Row 2a) or counselors (Row 2b), compared with a combination of both—is not associated with differences in student aspirations. Similar to first-generation students, continuing-generation students may also benefit more from having their advising only from counselors versus only from teachers (Row 2c). Relative to continuing-generation students, first-generation students have no different aspirations associated with receiving advice from only teachers (Row 3a) or from only counselors (Row 3b) rather than from both teachers and counselors.

Having career advising formally scheduled (versus receiving it voluntarily) does not have a significant association with first-generation students' aspirations but does have a negative association with continuing-generation students' aspirations. Results in Table 4 show that first-generation students whose schools implement formally scheduled advising do not have significantly different expectations from those whose schools implement voluntary advising (Row 1a). On the contrary, for continuing-generation students there is a negative association between aspirations and having advising formally scheduled compared to voluntary (Row 2a). Relative to continuing-generation students, first-generation students have no statistically different aspirations when their advising is scheduled instead of voluntary.

Table 5 shows that whether or not students in Costa Rica believe they will be studying or working in 5 years changes with scheduled versus voluntary career guidance. Compared to continuing-generation students, first-generation students are less likely to see themselves studying after high school graduation and more likely to see themselves working by that time (see Table 2, Panels C and D). There is no evidence of change in these expectations for first-generation or continuing-generation students who receive scheduled career guidance compared to voluntary advising at school. Results in Table 5 (Row 1a) show that, for first-generation students, having formally scheduled (rather than voluntary) advising is not associated with changes in expectations of studying or working after high school. Similarly, for continuing-generation students, formally scheduled advising (again, rather than voluntary) is not associated with changes in study and work expectations (Row 2a).

In sum, the results for Costa Rica indicate that first-generation students are about 2–3 percentage points less likely than continuing-generation students to expect completing some tertiary educational level in their future, and they are more likely to see themselves working after high school. For these students, specialization of the career guidance provider (teachers or counselors) compared to a combination of both professionals is not associated with changes in aspirations. However, there is some evidence that first-generation and continuing-generation students may benefit more from counselors' advising than from teachers' advising only. Formally scheduled advising is not associated with changes in expectations of first-generation students. For continuing-generation students, a negative association with aspirations is found when the advising is formally scheduled instead of voluntary.

CONCLUSIONS

First-generation students have fewer resources that help continuing-generation students make informed decisions about their post-secondary futures (Choy, 2001; Dickson and Pender, 2014). PISA (2018) data show that first-generation students account for 33 percent of the 15-year-old high school students in the United States and 44 percent in Costa Rica. In both countries, first-generation students have lower expectations of progressing in their studies after high school than continuing-generation students, though this gap is larger in the United States than in Costa Rica. Although the United States is a developed country and Costa Rica is a developing country, first-generation students in both countries disproportionately come from historically underserved and low-income households. In the United States, first-generation students are more likely to have an immigrant mother and are less likely to have attended early education. In Costa Rica, these students are more likely female, have fewer educational resources at home, and are more likely to be absent from school.

School-based services like career advising can help inform students' decision about their post-secondary pathways (Kraft, Bolves, and Hurd, 2021). Given the range of sources and scheduling formats inherent in school-based career advising, it is essential to understand which characteristics are most valuable to students who need these services most. In the current study, the results for both the United States and Costa Rica show that specialization of the career guidance provider—whether teachers or counselors, compared to a combination of both—is not associated with gains in the college aspirations of first-generation students. For both countries, whether advising services are formally scheduled or voluntary is not associated with significant differences in the aspirations of first-generation students. However, there is some evidence that students in Costa Rica may benefit more from the advising of counselors only than from teachers only. For

continuing-generation students in the United States, advising provided only by counselors (compared with both teachers and counselors) has a negative association with aspirations. Similarly, in Costa Rica, a negative association with the aspirations of continuing-generation students was found when the advising is formally scheduled instead of being voluntary.

In sum, this study shows that, on average, among schools that offer career advising, the provider or scheduling format of the advising is not associated with changes in aspirations of first-generation students. One hypothesis is that these results could be suggesting that the specific provider or scheduling format of career advising may matter less than the systemic barriers that constrain first-generation students' aspirations in the first place. Until these structural obstacles (e.g., limited financial resources, lower academic preparation, and competing work and family demands) are addressed, the form that advising takes may have little bearing on students' college aspirations, which could explain why, among schools that do offer advising, I find no significant differences across provider types or delivery formats. We know from previous studies that students formulate post-secondary aspirations based not only on their current situation but also on what they expect the college experience to be. For instance, previous work has shown that factors such as lower academic performance and preparation in high school (Choy, 2001; Pascarella et al., 2004), limited income to fund their studies, the need to live close to home, and balance between work and study (Choy, 2001; Horn and Nevill, 2006) can shape how first-generation students envision college as a possibility for themselves. These students also struggle with balancing responsibilities across family, work, and coursework (Jehangir, 2010; Engle and Tinto, 2008), which further constrains the horizon of what they perceive as attainable.

Future research should investigate how all these factors intertwine with school-based resources for first-generation students and consider the age at which counseling is provided and

the type of information discussed in those sessions. While it is not possible to distinguish in the PISA data set at what age the career counseling is being offered in each country, previous work has pointed out that students' aspirations could be formed as early as the 8th grade; therefore, counseling past this age might be less effective in changing student's aspirations. Similarly, studying the type of counseling provided to the student at each stage of their time in high school may be informative. For instance, counseling on information at early stages could be beneficial to shape student's aspirations while counseling on how to navigate the application process at later stages could be helpful to improve the matching with schools of students already decided to attend college.

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Table 1

Summary Statistics—Full PISA and Analytic Sample for First-Generation and Continuing-Generation Students in the United States and Costa Rica, PISA 2018

	Panel A: Full PISA Sample						Panel B: Analytic Sample					
	United States			Costa Rica			United States			Costa Rica		
	All	FG	CG	All	FG	CG	All	FG	CG	All	FG	CG
School variables												
Rural	0.63			0.85			0.64			0.86		
Public	0.97			0.84			0.97			0.89		
Class size	26.10			26.56			26.10			27.22		
Student-to-teacher ratio	16.82			15.20			16.85			15.63		
Share of teachers with bachelor's degree	0.79			0.62			0.80			0.63		
Weekly math classes	3.78			4.94			3.74			4.87		
N	113			194			108			179		
Student variables												
Female	0.50	0.51	0.50	0.51	0.56	0.47	0.50	0.49	0.50	0.49	0.53	0.46
Age	15.85	15.85	15.84	15.72	15.72	15.71	15.86	15.85	15.86	15.72	15.73	15.72
Native mother	0.76	0.70	0.79	0.84	0.81	0.87	0.77	0.71	0.79	0.85	0.82	0.87
Attendance to early education	0.87	0.81	0.89	0.93	0.92	0.95	0.86	0.80	0.89	0.93	0.92	0.94
HEDRES educational index	-0.11	-0.48	0.07	-0.72	-0.94	-0.56	-0.04	-0.37	0.10	-0.70	-0.90	-0.54
Absenteeism	0.24	0.27	0.22	0.52	0.55	0.50	0.21	0.24	0.20	0.47	0.50	0.45
N	3,120	1,025	2,095	5,535	2,421	3,114	1,930	589	1,341	3,627	1,605	2,022

Source: Author's calculation with PISA 2018 data.

Note. FG = first-generation students (students whose parents have not attended college); CG = continuing-generation students (students with at least one parent who has attended college). The full PISA sample excludes observations with missing data; the analytic sample is limited to students who scored above their school median in any PISA subject (math, science, or language) and schools that offer career advising services and serve both first-generation and continuing-generation students.

Table 2

Estimated Expectations of First-Generation Students After High School Graduation, PISA 2018

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: United States			Panel B: Costa Rica		
	Completing higher-education degree			Completing higher-education degree		
First-generation	-0.103***	-0.104***	-0.103***	-0.032***	-0.035***	-0.023**
	(0.018)	(0.017)	(0.017)	(0.011)	(0.010)	(0.011)
Constant	0.966***	0.613**	0.592**	0.918***	0.516**	0.652**
	(0.004)	(0.290)	(0.298)	(0.008)	(0.252)	(0.259)
Student controls	no	yes	yes	no	yes	yes
School controls	no	no	yes	no	no	yes
R2	0.037	0.068	0.070	0.003	0.018	0.026
Observations	1,930	1,930	1,930	3,627	3,627	3,627
	Panel C: Costa Rica			Panel D: Costa Rica		
	Studying in 5 years			Working in 5 years		
First-generation	-0.045***	-0.043***	-0.025	0.056***	0.056***	0.040**
	(0.017)	(0.016)	(0.016)	(0.017)	(0.016)	(0.016)
Constant	0.675***	0.099	0.245	0.270***	0.388	0.322
	(0.014)	(0.520)	(0.550)	(0.015)	(0.501)	(0.531)
Student controls	no	yes	yes	no	yes	yes
School controls	no	no	yes	no	no	yes
R2	0.002	0.017	0.026	0.004	0.013	0.024
Observations	3,207	3,207	3,207	3,207	3,207	3,207

Source: Author's estimation with PISA 2018 data.

Note. Results based on OLS regression (standard errors in parentheses) from Equation 1. Student controls include an indication for female students, their age, an indication of whether their mother is native, and whether they attended early education. School controls include indication of whether the school is located in a rural area and receives public funding, as well as the number of weekly lessons in math, class size, student-to-teacher ratio, and the share of teachers with a bachelor's degree. Errors are clustered at the school level. Statistical significance level: ***p<0.01; **p<0.05; *p<0.1.

Table 3
Estimated Association of Career Guidance With Students' Expectations to Attend College by Provider of the Guidance, PISA 2018

	United States			Costa Rica		
	(1)	(2)	(3)	(4)	(5)	(6)
First-generation	-0.116***	-0.114***	-0.113***	-0.051	-0.053	-0.025
	(0.027)	(0.026)	(0.027)	(0.037)	(0.040)	(0.041)
Teachers' guidance (β_1)	-0.015	-0.019	-0.025	-0.033	-0.034	-0.004
	(0.016)	(0.016)	(0.020)	(0.026)	(0.026)	(0.028)
Counselors' guidance (β_2)	-0.018**	-0.018**	-0.021**	0.024	0.015	0.025
	(0.009)	(0.008)	(0.010)	(0.030)	(0.029)	(0.030)
First-generation x teachers' (π_1)	0.005	0.007	0.009	0.020	0.018	-0.005
	(0.059)	(0.054)	(0.055)	(0.041)	(0.043)	(0.044)
First-generation x counselors' (π_2)	0.017	0.013	0.013	0.018	0.020	0.008
	(0.033)	(0.032)	(0.032)	(0.043)	(0.044)	(0.046)
Constant	0.977***	0.594**	0.503	0.941***	0.605**	0.709**
	(0.006)	(0.301)	(0.309)	(0.025)	(0.282)	(0.288)
Student controls	no	yes	yes	no	yes	yes
School controls	no	no	yes	no	no	yes
R2	0.037	0.07	0.076	0.009	0.024	0.030
Observations	1,881	1,881	1,881	3,145	3,145	3,145
Estimated effect of different types of advising on different groups						
1. For first-generation students						
a. teachers vs. both teachers and counselors ($\beta_1+\pi_1$)	-0.011	-0.013	-0.016	-0.013	-0.016	-0.009
	(0.063)	(0.056)	(0.056)	(0.033)	(0.034)	(0.033)
b. counselors vs. both teachers and counselors ($\beta_2+\pi_2$)	-0.0002	-0.005	-0.008	0.041	0.035	0.033
	(0.031)	(0.030)	(0.029)	(0.038)	(0.039)	(0.035)
c. counselors only vs. teachers only ($\beta_2+\pi_2-\beta_1-\pi_1$)	0.010	0.008	0.008	0.054*	0.051*	0.041
	(0.060)	(0.053)	(0.054)	(0.029)	(0.028)	(0.027)
2. For continuing-generation students						
a. teachers vs. both teachers and counselors (β_1)	-0.015	-0.019	-0.025	-0.033	-0.034	-0.004
	(0.016)	(0.016)	(0.020)	(0.026)	(0.026)	(0.028)
b. counselors vs. both teachers and counselors (β_2)	-0.018**	-0.018**	-0.021**	0.024	0.015	0.025
	(0.009)	(0.008)	(0.010)	(0.030)	(0.029)	(0.030)
c. counselors only vs. teachers only ($\beta_2-\beta_1$)	-0.003	0.001	0.004	0.057***	0.049***	0.029
	(0.016)	(0.016)	(0.019)	(0.019)	(0.018)	(0.018)
3. Differences between first-generation and continuing-generation students						
a. teachers vs. both teachers and counselors (π_1)	0.005	0.007	0.009	0.020	0.018	-0.005
	(0.059)	(0.054)	(0.055)	(0.041)	(0.043)	(0.044)

b. counselors vs. both teachers and counselors (π_2)	0.017	0.013	0.013	0.018	0.020	0.008
	(0.033)	(0.032)	(0.032)	(0.043)	(0.044)	(0.046)
c. counselors only vs. teachers only (π_2-π_1)	0.013	0.006	0.004	-0.002	0.002	0.013
	(0.055)	(0.050)	(0.051)	(0.026)	(0.026)	(0.026)

Source: Author's estimation with PISA 2018 data.
Note. Results are based on OLS regression (standard errors in parentheses) from Equation 2. Student controls include an indication for female students, their age, an indication of whether their mother is native, and whether they attended early education. School controls include an indication of whether the school is located in a rural area and receives public funding, as well as the number of weekly lessons in math, class size, student-to-teacher ratio, and the share of teachers with a bachelor's degree. Errors are clustered at the school level. Statistical significance level: ***p<0.01, **p<0.05, *p<0.1.

Table 4
Estimated Association of Career Guidance With Students' Expectations to Attend College by Type of Guidance, PISA 2018

	United States			Costa Rica		
	(1)	(2)	(3)	(4)	(5)	(6)
First-generation	-0.079***	-0.080***	-0.078***	-0.050	-0.055	-0.046
	(0.023)	(0.023)	(0.023)	(0.036)	(0.035)	(0.037)
Scheduled guidance (θ)	0.011	0.008	0.011	-0.024	-0.020	-0.038**
	(0.013)	(0.013)	(0.013)	(0.015)	(0.013)	(0.017)
First-generation x scheduled (λ)	-0.037	-0.036	-0.038	0.014	0.017	0.020
	(0.032)	(0.031)	(0.031)	(0.038)	(0.037)	(0.039)
Constant	0.956***	0.584*	0.484	0.943***	0.534*	0.728**
	(0.010)	(0.306)	(0.309)	(0.012)	(0.283)	(0.284)
Student controls	no	yes	yes	no	yes	yes
School controls	no	no	yes	no	no	yes
R2	0.038	0.071	0.076	0.004	0.020	0.029
Observations	1,850	1,850	1,850	3,145	3,145	3,145
Estimated effect of different types of advising on different groups						
1. For first-generation students						
a. scheduled vs voluntary advising (θ+λ)	-0.026	-0.029	-0.027	-0.009	-0.002	-0.018
	(0.031)	(0.029)	(0.028)	(0.032)	(0.033)	(0.037)
2. For continuing-generation students						
a. scheduled vs voluntary advising (θ)	0.011	0.008	0.011	-0.024	-0.020	-0.038**
	(0.013)	(0.013)	(0.013)	(0.015)	(0.013)	(0.017)
3. Differences between first-generation and continuing-generation students						
a. scheduled vs voluntary advising (λ)	-0.037	-0.036	-0.038	0.014	0.017	0.020
	(0.032)	(0.031)	(0.031)	(0.038)	(0.037)	(0.039)

Source: Author's estimation with PISA 2018 data.
Note. Results are based on OLS regression (standard errors in parentheses) of Equation 3. Student controls include an indication for female students, their age, an indication of whether their mother is native, and whether they attended early education. School controls include indication of whether the school is located in a rural area and receives public funding, as well as the number of weekly lessons in math, class size, student-to-teacher ratio, and the share of teachers with a bachelor's degree. Errors are clustered at school level. Statistical significance level: ***p<0.01, **p<0.05, *p<0.1.

Table 5

Estimated Association of Career Guidance With Students' Expectations to Study or Work After High-School Graduation by Type of Guidance, Costa Rica 2018

	Studying in 5 years			Working in 5 years		
	(1)	(2)	(3)	(4)	(5)	(6)
First-generation	0.025	0.024	0.040	0.026	0.026	0.011
	(0.067)	(0.066)	(0.067)	(0.068)	(0.069)	(0.071)
Scheduled guidance (θ)	0.058	0.065	0.053	-0.048	-0.053	-0.046
	(0.068)	(0.067)	(0.067)	(0.074)	(0.074)	(0.075)
First-generation x scheduled (λ)	-0.083	-0.079	-0.077	0.037	0.034	0.033
	(0.071)	(0.071)	(0.070)	(0.072)	(0.074)	(0.074)
Constant	0.627***	-0.135	0.008	0.309***	0.548	0.453
	(0.065)	(0.556)	(0.602)	(0.071)	(0.533)	(0.578)
Student controls	no	yes	yes	no	yes	yes
School controls	no	no	yes	no	no	yes
R2	0.004	0.018	0.028	0.005	0.014	0.025
Observations	2,780	2,780	2,780	2,780	2,780	2,780
Estimated effect of different types of advising on different groups						
1. For first-generation students						
a. scheduled vs voluntary advising (θ+λ)	-0.025	-0.014	-0.024	-0.011	-0.019	-0.013
	(0.052)	(0.051)	(0.051)	(0.058)	(0.057)	(0.054)
2. For continuing-generation students						
a. scheduled vs voluntary advising (θ)	0.058	0.065	0.053	-0.048	-0.053	-0.046
	(0.068)	(0.067)	(0.067)	(0.074)	(0.074)	(0.075)
3. Differences between first-generation and continuing-generation students						
a. scheduled vs voluntary advising (λ)	-0.083	-0.079	-0.077	0.037	0.034	0.033
	(0.071)	(0.071)	(0.070)	(0.072)	(0.074)	(0.074)

Source: Author's estimation with PISA 2018 data.

Note. Results are based on OLS regression (standard errors in parentheses) of Equation 3. Student controls include an indication for female students, their age, an indication of whether their mother is native, and whether they attended early education. School controls include an indication of whether the school is located in a rural area and receives public funding, as well as the number of weekly lessons in math, class size, student-to-teacher ratio, and the share of teachers with a bachelor's degree. Errors are clustered at school level. Statistical significance level: ***p<0.01, **p<0.05, *p<0.1.